# 國立台灣科技大學 114學年 第2學期　課程大綱

## Spring 2026 NTUST Course Outline

授課教師：梁書豪

Instructor:Shuhao Liang

課程名稱：物聯網之雲和霧計算概論

Course Title：Cloud and Fog Computing in the Internet of Things

2026/5/5

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| 課程代號： SI5038701<br>Course Code<br>學分數： 3<br>Credits | 必選修：選修/半學年<br>Required/Electve:Elective/Half Yr.<br>先修課程：<br>Prerequisites |
| 節次教室：<br>Time/Location | R2(華夏恆毅樓D405) R3(華夏恆毅樓D405) R4(華夏恆毅樓D405) |
| 專業核心能力：<br>Core Professional Competencies | ■ 專業知識及技能<br>■ 解決工程與管理問題之能力<br>■ 評估分析與獨立解決問題之能力 |
| 課程網址：<br>Course Website | https://github.com/iiotntust/1132CFIOT |
| 課程宗旨：<br>Course Objectives | This course introduces cloud and fog computing technologies for developing applications and databases for the Internet of Things. The lecture presents the cloud model, the architecture of the Internet of Things, computing resource arrangement and simulation (fog modeling), security issues and protection, and ultra-scale system design. The curriculum tends to be broader in scope, with practice rather than drill in a few specific subjects, so it comprises lectures, hands-on activities, and problem-based learning (PBL). |
| 課程大綱：<br>Outline of Lectures | Outline of the course weekly - (Lectures, AWS Academy Cloud foundation, Hands-on and PBL project)<br>Week01: Introduction to Cloud and Fog Computing in IoT and Class Rules<br><br>Week02: Chapter 1: Fog Computing Fundamentals in the IoT (Textbook: Fog Computing Fundamentals in the Internet-of-Things)<br>Week03: Hands-on: Basic - Arduino (ESP-32 SDK)<br>Week04: Visit 2026 Smart City Expo.(3/19)<br>Week05: Chapter 2: IoT Resource Estimation Challenges and Modeling in Fog<br>Week07: Chapter 3: Tackling IoT Ultra Large Scale Systems: Fog Computing in Support of Hierarchical Emergent Behaviors<br>Week08: Midterm - PBL project proposal. (+ AWS QUIZ Module 1-4, General Performance)<br>Week09: Hands-on: AWS IoT platform<br>Week10: Chapter 4: The Present and Future of Privacy-Preserving Computation in Fog Computing<br>Week11: Chapter 5: Self-Aware Fog Computing in Private and Secure Spheres<br>Week12: Chapter 6: Urban IoT Edge Analytics<br>Week13: Hands-On: Database - MySQL (Structured), NoSQL (non-Structured); AWS Cloud Service Review (Module 5 - 8)<br>Week14: Chapter 7: Control-as-a-Service in Cyber-Physical Energy Systems over Fog Computing<br>Week15: Chapter 8 Leveraging Fog Computing for Healthcare IoT; AWS AI - machine learning<br>Week16:Final presentation and demo (PBL) |
| | 講授 Lecture：50% |

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| 授課方式：<br>Method of Instruction | 分組討論 Group discussion：10%<br>案例研討 Case study：10%<br>操做練習 Practical exercises：30%<br>講授 Lecture：Visit Smart City Expo (March 19, 2026):https://en.smartcity.org.tw/index.php/en-us/% |
| 教科書：<br>Textbooks | Fog Computing in the Internet of Things; Editors, Amir M. Rahmani, Pasi Liljeberg, TU Wien, Axel Jantsch, Jürgo-Sören Preden; Publisher, Springer International Publishing AG 2018. (ISBN 978-3-319-57638-1) |
| 參考書目：<br>References | 1. AWS Academy - AWS Academy Cloud Foundations; students can receive a badge for completion. (Free account provides in the class) |
| 修課須知：<br>Notice | TA will assist students with examples in the ESP-32 and AWS Cloud hands-on exercises. |
| 評量方式：<br>Grading | General performance in class (attendance, quiz, homework, and hands-on practice) 40%.<br>Mid-term report: PBL project proposal, 30%<br>Final report: presentation and demonstration, 30% |
| 備註說明：<br>Notes | 1. This course provides all components for hands-on exercises and PBL projects.<br>2. The exercise of Cloud computing utilizes the AWS Academy Platform; each student can have a free account with US 100 credit for the AWS Cloud service. |